PROCEEDINGS OF THE SURGICAL SECTION OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Stated Meeting, October 12, 1894.

JOHN B. ROBERTS, M.D., President, in the Chair.

AN IMPROVED LITHOTRITE.

DR. W. S. FORBES exhibited an improved lithotrite, and demonstrated the method of testing and measuring the strength of lithotrites, as well as the measured crushing resistance of vesical calculi.

This new lithotrite somewhat resembles the Civiale, Thomson, and Bigelow instruments in general shape, and in having a movable male blade. As regards the mechanism and construction, the Forbes instrument is entirely different. In the first place, in the cross section of the female blade of usual construction, the groove is shaped so that when great force is exerted the tendency is to spread apart the sides of the groove, allowing the male blade to rise up. In the new lithotrite the groove has a V-shaped or dove-tailed flange on each side, so that this accident cannot occur. The shank is stronger, the bulk of the metal being put above the slot. The septum of the male blade is unusually thick. The shoe of the female blade is spread so that it will not catch the wall of the bladder, and also to allow the *débris* to come out. The surface of the male jaw presents a median cutting edge bevelled to each side, with two cross ridges on the surface to prevent bursting a stone and injury to the bladder by flying fragments. The spur rises to an unusual height on the male jaw for greater strength. The handle of the instrument is entirely new. The instrument is unlocked by simply turning the handle half a turn to the left, which releases the male blade ; it is immediately locked by reversing the motion of the handle. The thread on the screw has the advantage of increasing the power and of giving the stone time to break without unduly straining the instrument.

The handle or screw mechanism belongs to what is known as the interrupted screw-type. It consists of an internally screw-threaded barrel having the threads cut away the entire length of the barrel at alternate spaces of ninety degrees each.

This screw-barrel has an end movement in the cylindrical handle of about one-sixteenth of an inch. Working in this barrel is a pair of screw-blocks, likewise having their screw-threads interrupted at alternate spaces of ninety degrees each. Thus the screw-blocks may be slid up and down the barrel without the threads engaging. When it is necessary, however, to apply the power, the screw-blocks are turned by means of the screw-handle, and the threads engage immediately. One screw-block is rigidly keyed to the screw-handle shaft, and the other is so formed that it may have a motion of ninety degrees around the screw-handle shaft. Thus, when the screw-handle shaft is turned to the right the screw-block that is rigidly attached to the shaft is brought into mesh with the threads of the screw-barrel, and a further turn of the handle of ninety degrees brings the rotatable screw-block also into mesh. The screw-threads on these two blocks are, therefore, now no longer interrupted, relatively to the barrel, but continuous, and we have in substance a solid plug, or screw-block, engaged with the threads in the screw-barrel. As long as the screw-handle is turned to the right this state of affairs continues, and the male jaw is propelled towards the female jaw. After the calculus is crushed the instrument may again be unlocked and the jaws separated by turning the screw-handle to the left until it stops. This left-hand motion is never more than half a turn. Owing to the sixteenth-inch play of the screw-barrel in the cylindrical handle it readily adjusts itself to engage with the thread of the screw-block, and the calculus is, therefore, never dropped in locking the instrument. The screw-handle has been made larger than heretofore, because it aids the easy and gentle manipulation of the instrument. The shape of the handle is also different, and calculated to serve its purpose. Being made of very thin sheet-metal it is at once strong, and as light as the lightest handle now employed, which is, perhaps, the soda-water-fountain wheel of Thomson or Civiale. To sum up this instrument, it may be likened to a chain in which each link is of equal strength, and that means the maximum strength for a given size and weight, or, in other words, a correct disposition of metal.

On testing this instrument it was found that up to 600 pounds it would not suffer any injury, the blades yielded a little at this point, but regained their original position by the natural elasticity of the metal when the strain was removed. Above this point they did not spring back. But it was found that this amount of pressure was more than could be obtained by the hand, and therefore this accident would not occur in an operation. Moreover, it was found that the blades closed completely, and could be withdrawn from the bladder. The greatest power exerted simply by the hand with this instrument was 540 pounds. While not sufficient to injure the lithotrite, it is more than sufficient to break any stone occurring in the human bladder.

The screw-thread is large, but is a slow thread. It was found that a stone might resist a pressure for a moment, but then it would break without increasing the force. There is an advantage, therefore, in a slow thread, as it gives the stone time to break, as well as increases the power. There is a great loss of power in friction in all lithotrites. In this instrument the friction is greater, but the actual amount of force nearly double that exerted by the ordinary patterns with which it has been tested and compared.

THREE CASES OF ABDOMINAL SECTION FOR GUNSHOT WOUNDS.

DR. ROBERT G. LE CONTE reported the following case: An Italian laborer, aged thirty-five, was brought into the Pennsylvania Hospital at 7.30 P.M., August 2, 1893, in a condition of profound shock. He had received four wounds from a 38-calibre revolver. The first had penetrated the abdomen in the left lumbar region, on a line with the umbilicus; as he turned to run away he received a second in the left side, between the twelfth rib and the crest of the ilium; the third penetrated the back in the left lumbar region; and the fourth passed through the right arm at the upper third. Hypodermics of strychnine and digitalis were given, with external heat, etc. When his temperature began to rise he was immediately placed under ether. The abdomen was opened in the median lines, and the cavity was found full of blood. Fifteen perforating wounds of the intestine were brought together with fine silk by means of the Lembert suture, and four wounds of the mesentery, in which the bowel was not involved, were stitched together, besides a few nicks in the bowel which had not penetrated to the mucous coat. A hasty examination of the spleen, stomach, and liver was made, and as far as he could tell they had not been wounded. As the urine came clear from the catheter it was inferred that the kidneys had not been touched. The abdominal cavity was then flushed out with warm, distilled water that had previously been boiled, until the fluid ran clear, a glass drain inserted, and the abdomen closed with silkworm-gut sutures, the fascia being brought together with a continuous catgut suture. During the etherization the patient's condition was very bad, and hypodermics of strychnine and digitalis had to be repeatedly given. The operation lasted not quite two hours. At the conclusion his temperature was $97\frac{4}{5}°$ F. and the pulse was almost imperceptible. The treatment consisted of strychnine, brandy, and digitalis by hypodermic, and nothing was given by the mouth. At 3 A.M. the temperature had risen to 101°; pulse 96 and weak; respiration 30. He was delirious and very restless, and had to be strapped and morphine given. At 10 A.M., his condition had improved. Temperature had fallen to 99°; pulse 110 and stronger; respiration 24, and he was quiet and his mind was clear. During the night the glass drain had been sucked dry every ten or fifteen minutes with a syringe, and the quantity of blood or bloody serum withdrawn amounted to about an ounce an hour. This gradually diminished to half an ounce by morning; urine was passed free from blood.

At 4 P.M. his temperature was $98\frac{3}{5}°$, pulse 114, and respiration 22. The abdomen was moderately distended, and there was frequent belching of wind, but no vomiting. No flatus had been passed. Towards evening the temperature began to rise, the pulse became weaker, delirium set in, and the patient slowly grew worse until death intervened, the next day at noon, thirty-seven hours after operation. At the post-mortem examination, made by the coroner's physician, two of the bullets were recovered; one had entered the liver from behind, passed through it, and lodged in one of the short ribs on the right side; the other was found just under the omentum near the stomach. None of the stitches in the intestines had given away, and no extra perforations of the bowel were found.

DR. LEWIS W. STEINBACH detailed a second case, as follows: A. H., aged thirty-six years; white; a Philadelphia police sergeant, was admitted to the Polyclinic Hospital August 30, 1894. Twenty minutes previous to admission he had been accidentally shot in the abdomen by a 44-calibre pistol.

His temperature on admission was 98°, pulse 60, respirations 28. He was weak and faint, although externally he had not lost much blood. With the assistance of two officers he had walked from the place of shooting to the hospital, comprising several blocks.

Patient complained of some pain around umbilicus, and was unable to void his urine.

The history obtained from the patient states that he was sitting in a chair while the person who shot him was standing to his right, the pistol pointing slightly to patient's left. On examining the abdomen a small wound one-quarter inch in diameter was seen two inches below and to the right of the umbilicus.

After cleansing the part, a probe was gently inserted into the wound, and it was probed in all directions. The muscles had been torn up in several directions, so that this was not satisfactory, although there seemed to be a track in an upward direction and to the left, which from the history seemed to be the true course which the ball had taken. A small quantity of sterile water was then injected into the wound; but, as it returned, it could not be made out that the abdominal cavity had been entered, although this was what was thought to be the case.

Patient was etherized, and after all antiseptic precautions had been taken, a grooved director was introduced into the wound, and after some little trouble, as the track was irregular, it was laid open to about an inch in extent. Upon pushing the director further it entered the peritoneal cavity. A three-inch incision was then made in the median line, and upon opening the peritoneal cavity a considerable quantity of blood escaped through the wound. The intestine was carefully examined, and nine perforations made by the bullet were found. These were principally in the lower part of the jejunum and the ileum. One was wholly in the mesentery, while the others chiefly lay at junction of it with intestine; and it was from these that the greater part of the blood was oozing. The colon was not perforated.

The various perforations were sutured with Lembert suture, silk being used. After carefully going over the small intestines they were replaced, and the abdominal cavity thoroughly washed with warm sterile water until all blood and clots were removed, and the fluid returned clear. A glass drainage-tube was placed in the lower part of the wound, and silkworm-gut sutures introduced, closing the incision. The ordinary antiseptic dressing was applied.

The bullet had not been found, but was thought to have taken an upward course to the right of the spinal column.

The operation was a long one, and it was found necessary to administer strychnia and atropia to combat the shock. Temperature after operation was 99.8°; pulse, 120; respiration, 28.

The patient came out of the ether and seemed to rally; but, during the evening, his pulse became weak, thready, and very rapid, reaching 156 by 9 P.M. The temperature kept rising slowly and steadily until 3 A.M. it reached 102.4°. About four ounces of fluid blood and serum were obtained through the drainage-tube. It did not clear, though it lessened in quantity towards morning. It was also noticed that the patient coughed up a small quantity of a dark chocolate-colored fluid. Stimulating treatment was kept up during the night. He complained greatly of thirst, was extremely restless, it being with difficulty he was restrained in bed. But at no time did he complain of pain.

The pulse became weaker and weaker, and at 8.36 o'clock, the morning following operation, he died. Temperature taken half an hour previous to death registered 105.6°.

An autopsy was held by the coroner, and it was found that the bullet had pursued an upward course after striking the spinal column, passing beneath the diaphragm, rupturing some of the vessels at the root of the right lung, which was engorged with blood. The right pleura was filled with blood. There was also blood in the abdominal cavity, due to rupture of small vessels in liver tissue. The intestines looked ecchymotic in places; but the places that had been sutured showed commencing union. The bullet was not found, but traced to muscles of the back.

DR. THOMAS S. K. MORTON reported a third case, as follows: A boy, aged nine and a half years, was admitted to the Pennsylvania Hospital, September 11, 1894, with a history that he had been shot by a 32-calibre revolver, at short range, but a few moments previously. Dr. Morton saw him almost at once after admission, and found a bullet wound one-and-a-half inches below and half an inch to the left of the ensiform cartilage. He was not especially shocked. Was said to have vomited considerable blood, and complained of great pain in the epigastrium. Abdomen not distended.

Ether was administered and perforation of the abdominal cavity proved by enlarging the bullet-wound slightly and passing a probe. Having thus made certain that the peritoneum had been entered, an incision was made in the median line from the ensiform cartilage downward for four inches. Upon laying open the peritoneum much fluid blood and some large clots flowed out. It was found that the ball had passed through the right lobe of the liver, two-and-a-half inches behind the anterior margin, then emerged just above the gastro-hepatic omentum, had almost totally destroyed the lobus Spigelii, then had torn a large hole in the lesser omentum, again perforated the peritoneum, struck the first lumbar vertebra, and become lost. Blood welled up in large quantities from the posterior peritoneal opening, mostly venous, but partially arterial. A finger-tip only could be passed into this wound. There was no wound of stomach or intestines. The wound of the right lobe, as well as that of the Spigelian lobe of the liver, was not bleeding. A column of iodoform gauze was carried down so as to block the wounds of the lesser omentum and posterior layer of the peritoneum, and at the same time to press upon the mutilated Spigelian lobe and posterior or exit wound of the right lobe of the liver. The packing was continued and brought out through the parietal wound. The wound of entrance into the right lobe was not interfered with. The abdominal wound was now closed around the gauze-drain after copious irrigation of the surroundings with hot salt solution. As it was suspected that much blood had gravitated into the pelvis and lower portions of the abdomen, which could not readily be washed out by irrigation from above, it was determined to make a small opening above the pubis for that purpose and to put in a drain-tube. Accordingly a half-inch incision was made just above the symphysis, and much fluid blood and clots were washed out through it by means of a long irrigator tube. A glass drain was carried through this wound down to the bottom of the pelvis, to serve as an index should further hæmorrhage take place into the abdomen. But, despite all efforts to the contrary, the lad died in a few hours.

At the post-mortem examination it was discovered that the ball had passed between the aorta and vena cava, and perforated the right crus of the diaphragm before striking the first lumbar vertebra. In the latter it cut a large groove, and was deflected upward and outward through the pleura, and into the substance of the right lung, where it was found embedded. The lower lobes of this lung were distended by blood, and over a quart in addition filled the pleural sac. No wounds of other viscera were discovered. There was no blood in the abdominal cavity.